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Toma

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(54) **AUTOMATIC TURNING ICE BLOCK APPARATUS AND METHOD**

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(51) **Int. Cl.**

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F25C 1/10	(2006.01)
F25C 1/22	(2006.01)
F25C 1/12	(2006.01)

(52) **U.S. Cl.**
CPC ***F25C 1/12*** (2013.01)

(58) **Field of Classification Search**
CPC F25C 3/00; F25C 1/10; F25C 1/22
See application file for complete search history.

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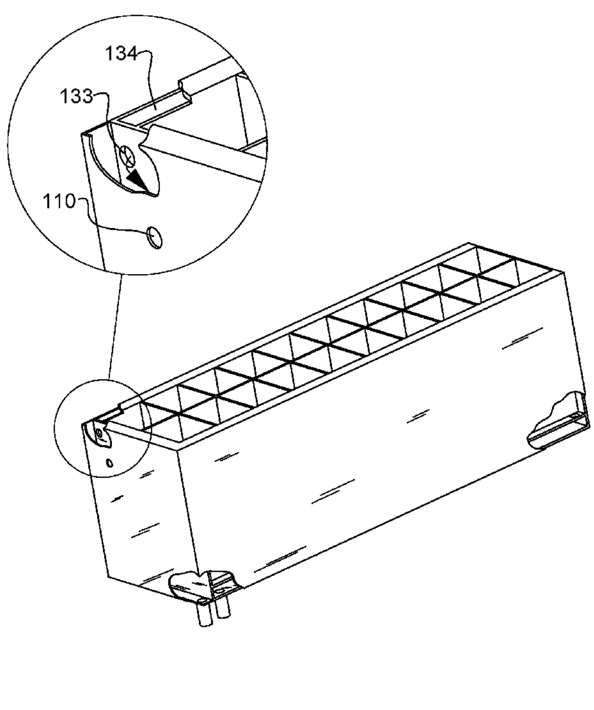
(57) **ABSTRACT**

An evaporator apparatus comprising at least one container configured to maintain liquid for freezing and a plurality of heat transfer compartments configured around the at least one container to allow for the flow of cold anti-freeze in order to freeze the liquid and warm anti-freeze in order to thaw frozen blocks of ice contained within the evaporator apparatus. A lever integrated into the body of the evaporator to allow for rotation of the evaporation in order to harvest the frozen blocks of ice. The evaporator further including, at least one inlet opening to allow for the inflow of anti-freeze into the plurality of heat transfer compartments and at least one outlet opening to allow for the discharge of anti-freeze from the evaporator apparatus.

13 Claims, 12 Drawing Sheets



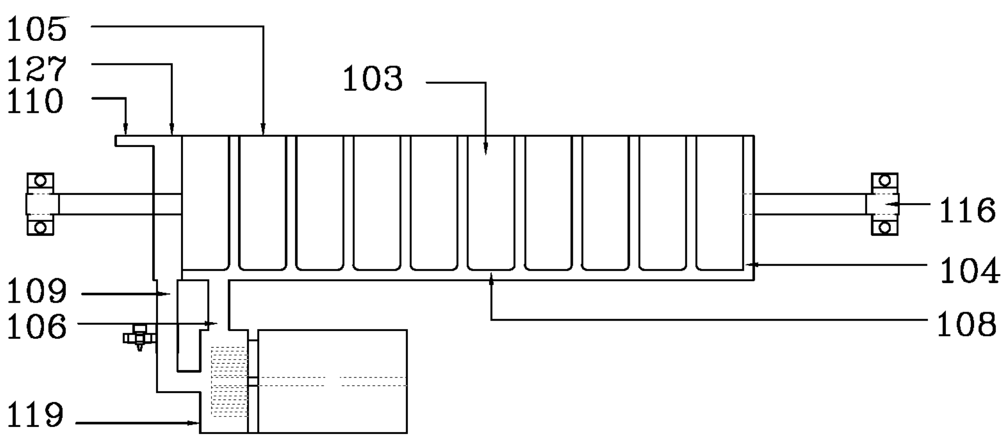


FIG. 1

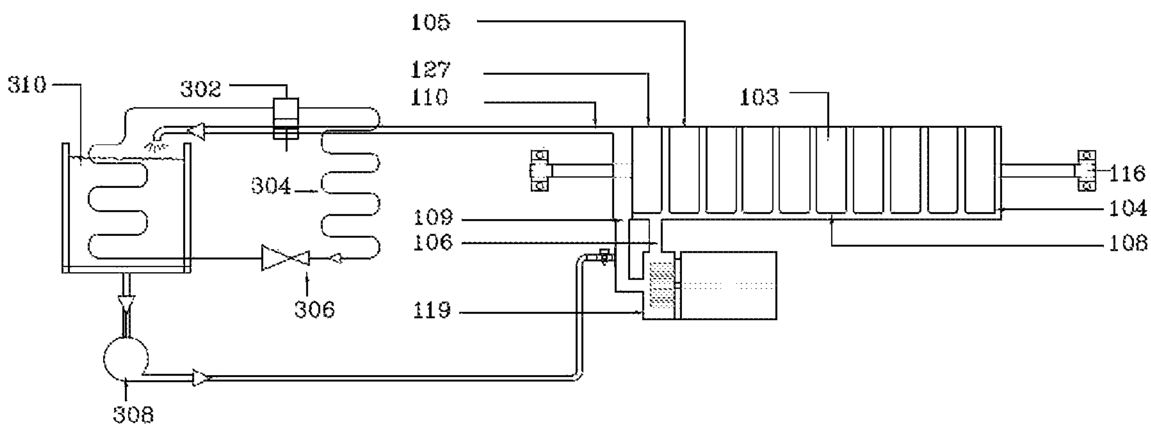


FIG. 2

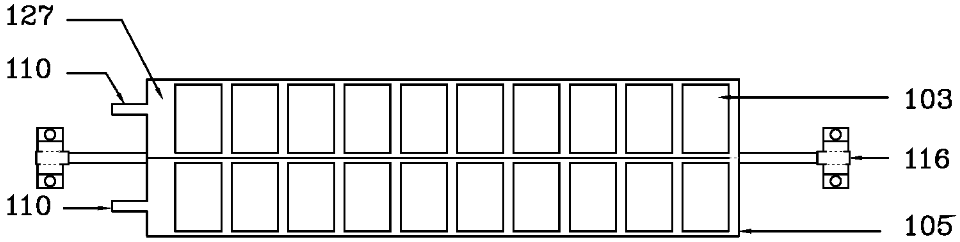


FIG. 3

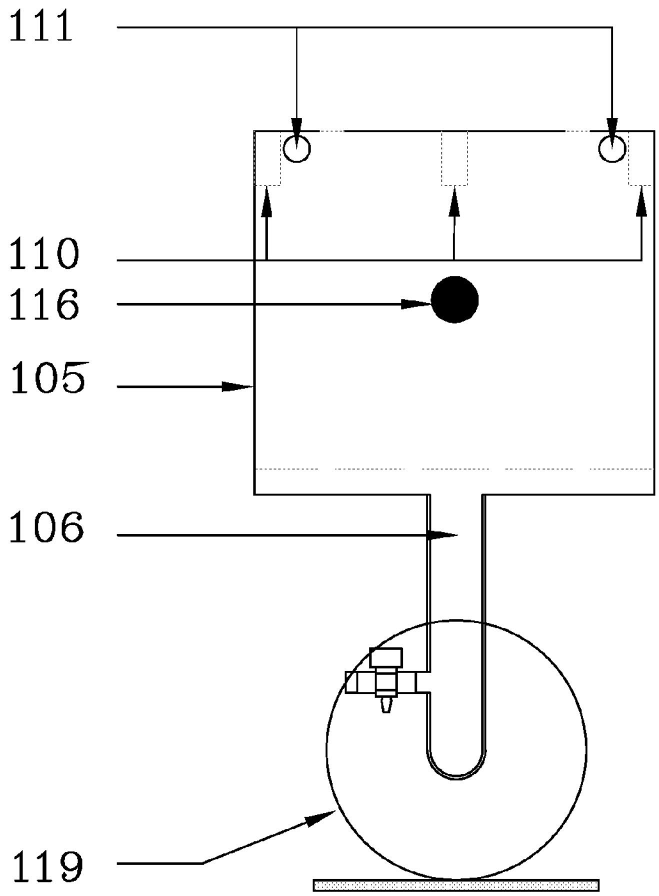


FIG. 4

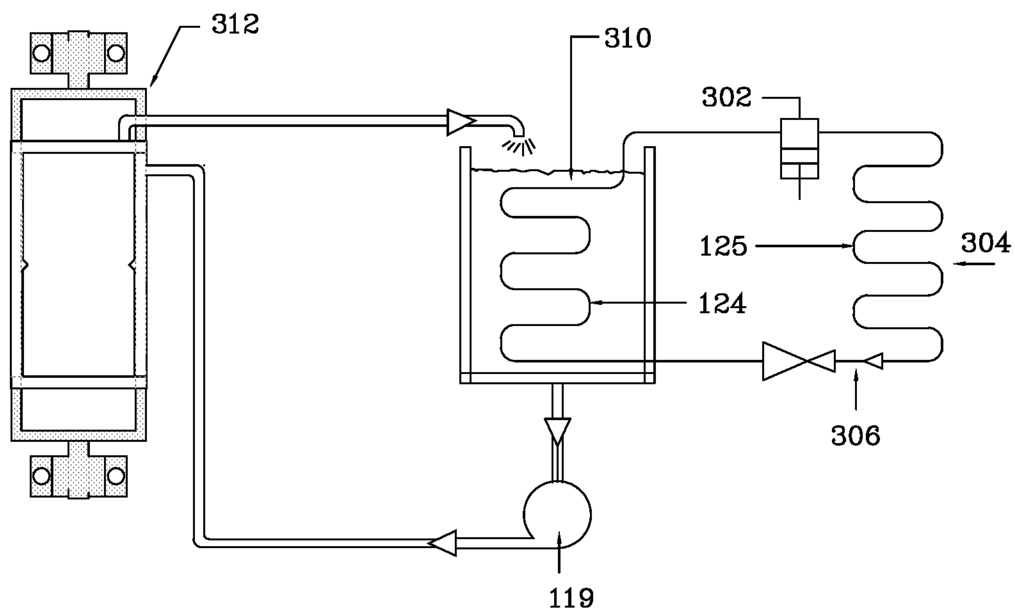


FIG. 5

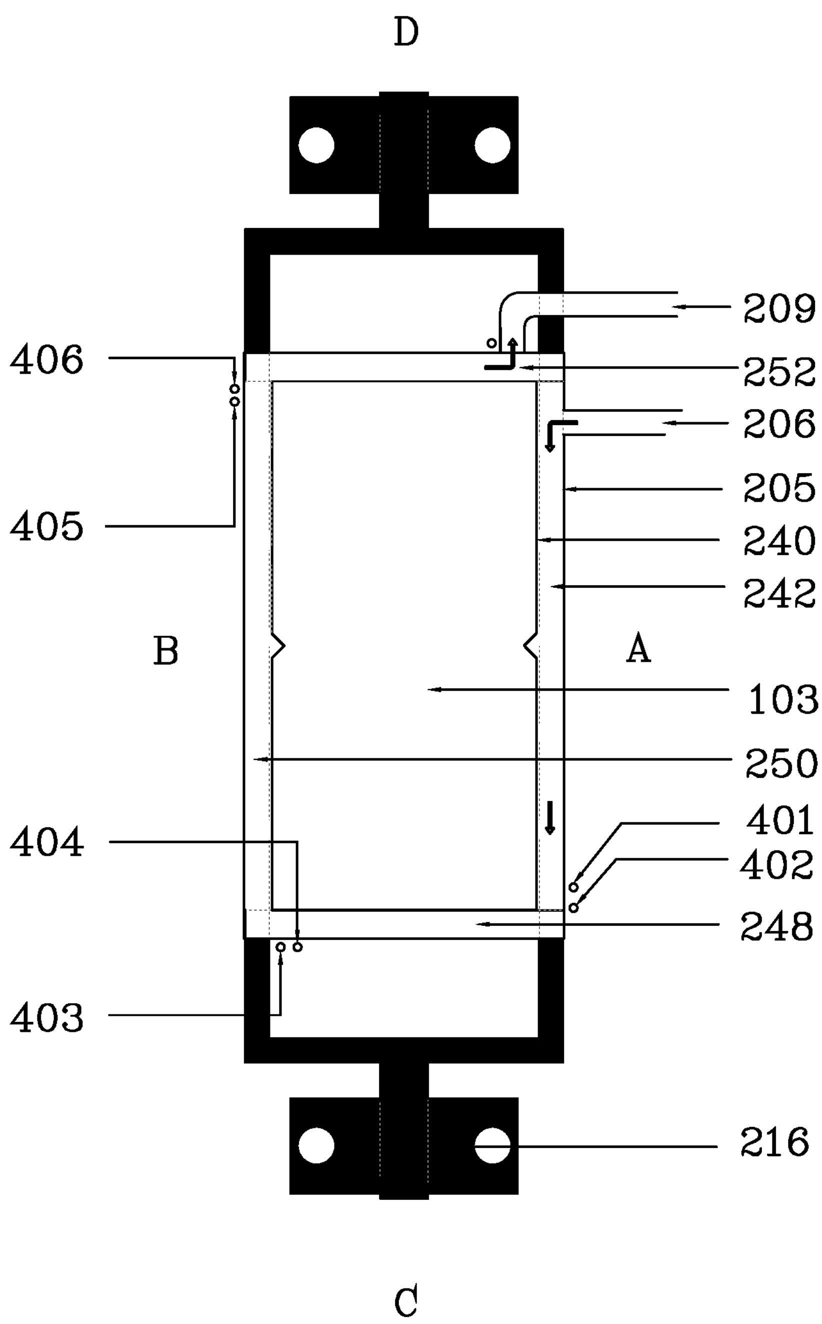

D
209
406
252
206
205
405
240
242
B
A
103
250
404
401
402
248
403
216
C

FIG. 6

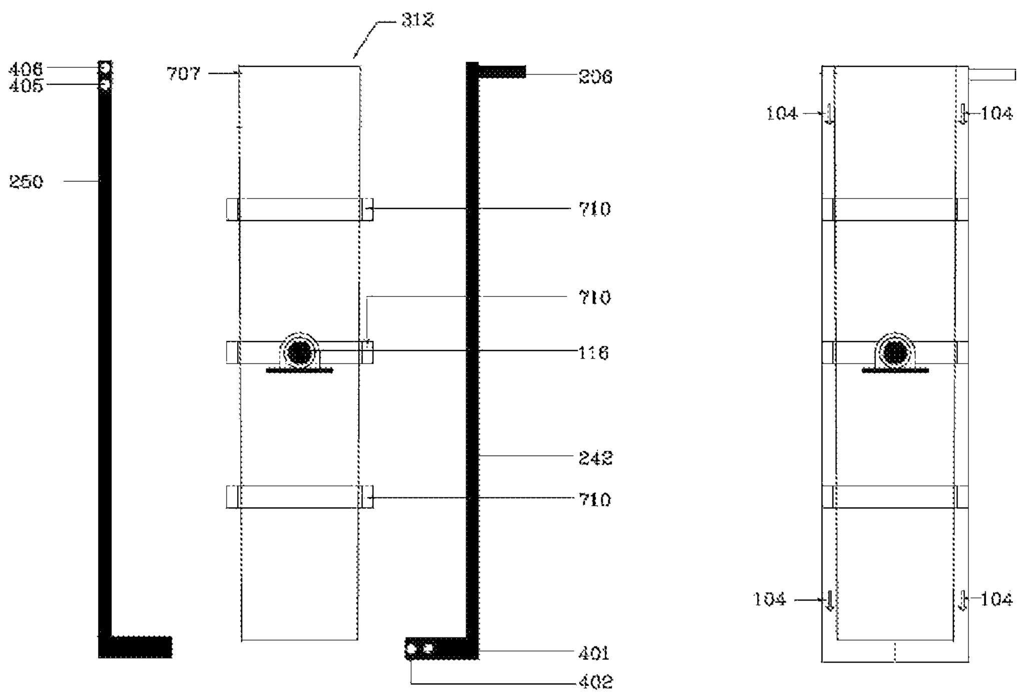
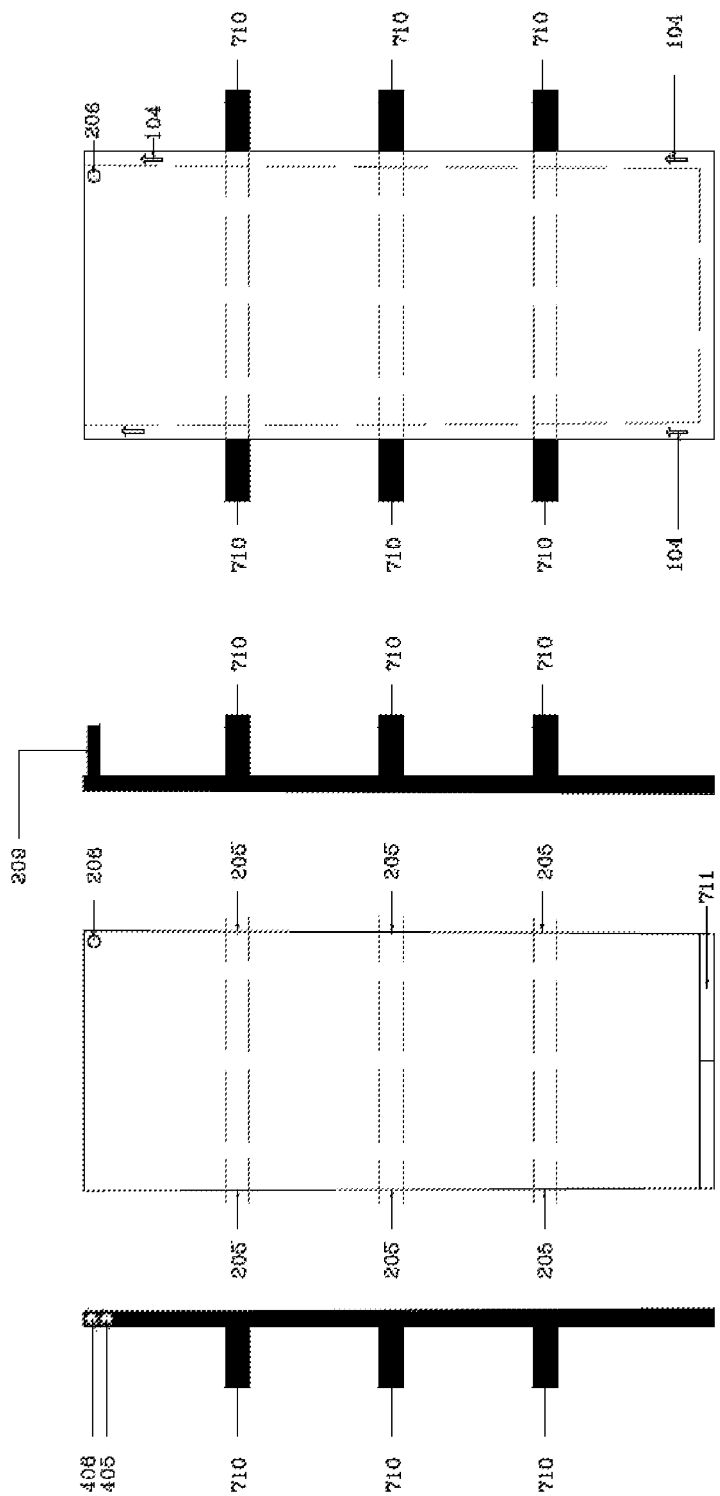

312
406
405
707
206
104
104
250
710
710
116
242
710
104
104
401
402

FIG. 7


208
104
710
710
710
104
710
710
710
104
710
710
710
209
208
205
205
205
711
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205
205
408
405
710
710
710

FIG. 8

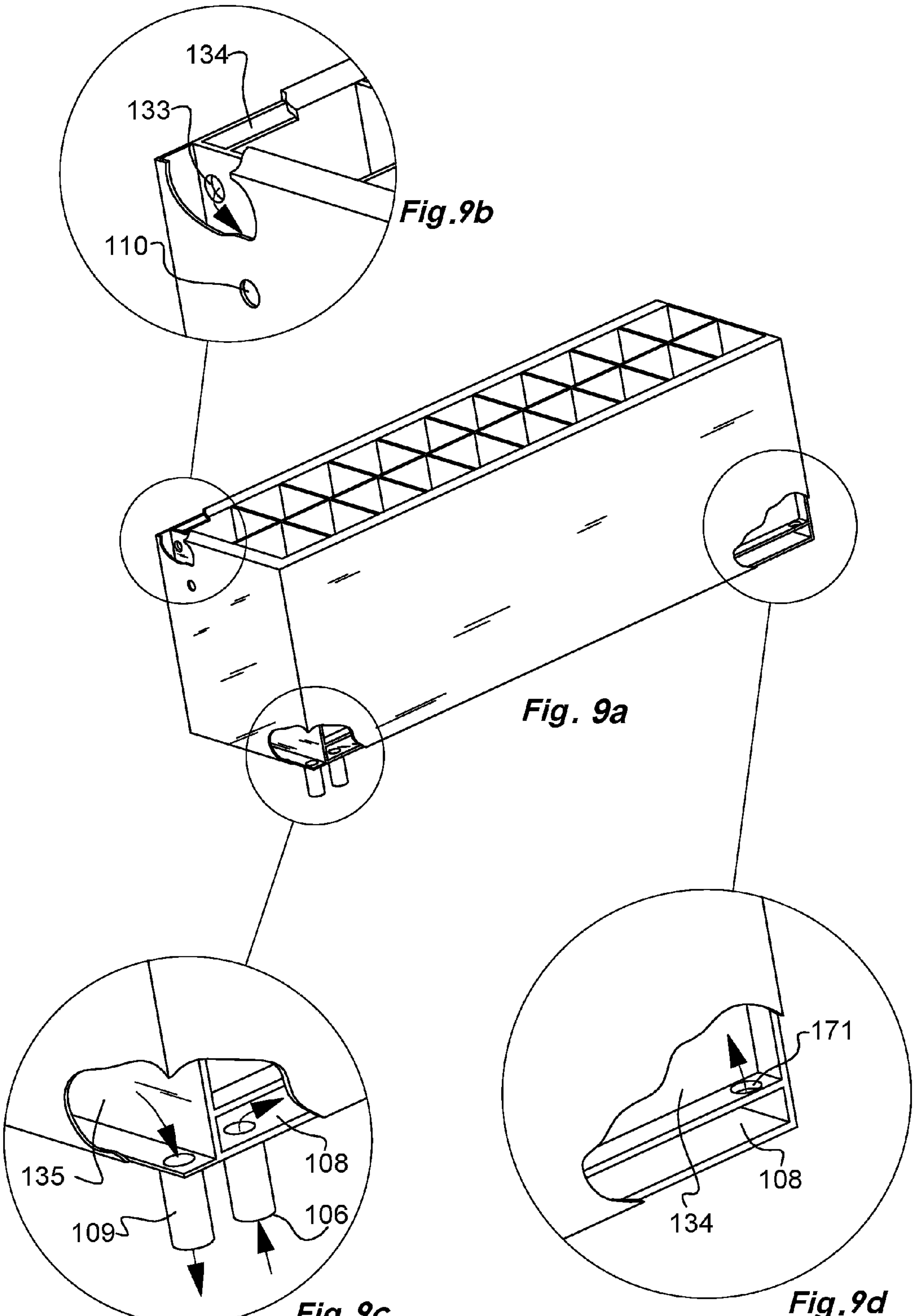


Fig.9b

Fig. 9a

Fig.9c

Fig.9d

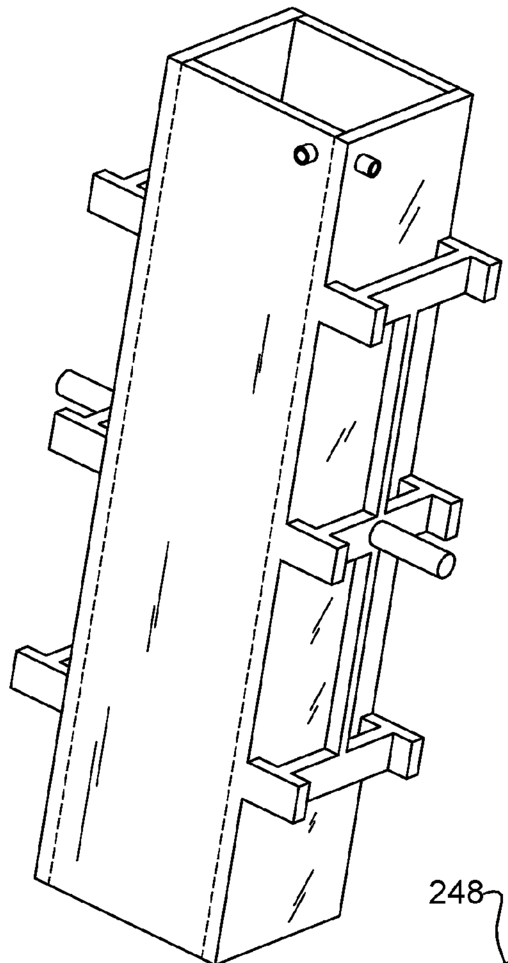


Fig. 10a

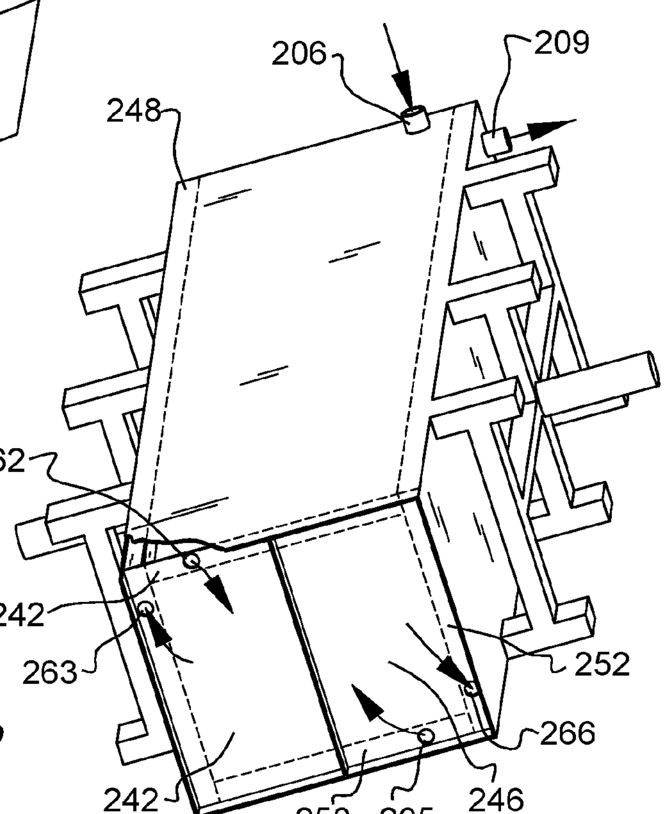


Fig. 10b

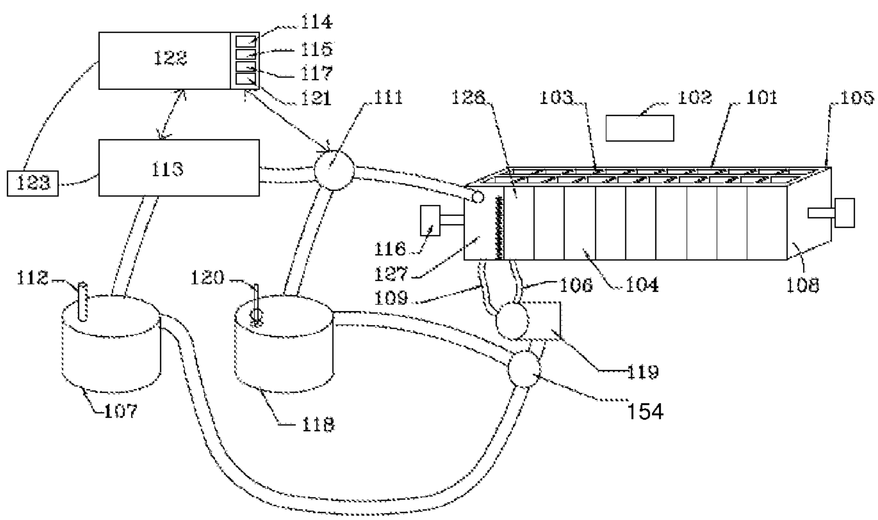
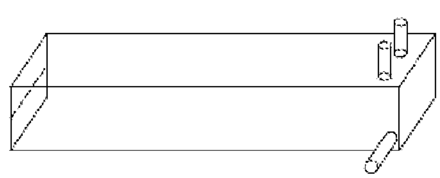

114
115
117
121
122
113
123
111
126
103
102
101
105
116
127
109
106
104
108
112
120
107
118
119
154

FIG. 11



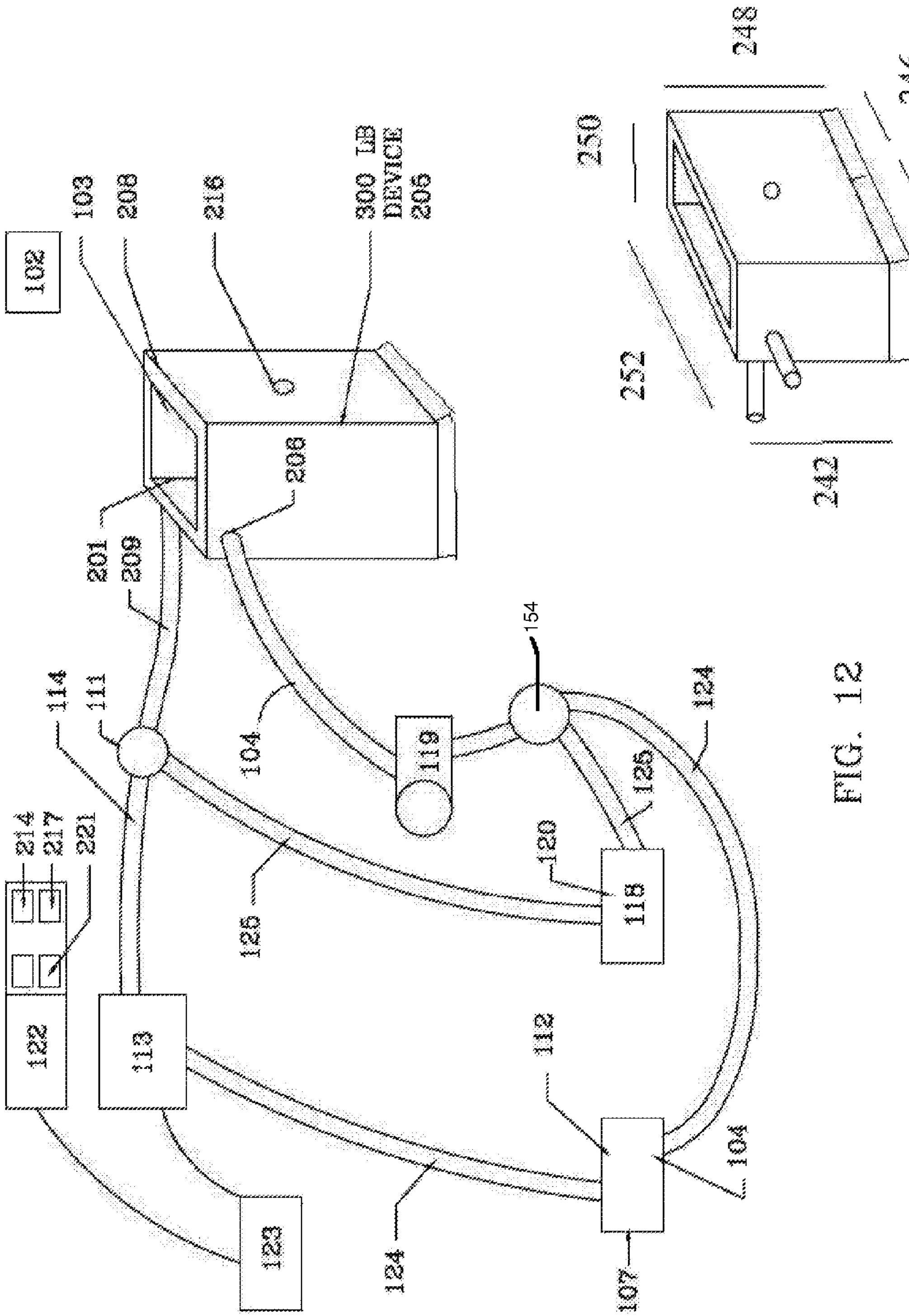

102
103
208
216
300 LB
DEVICE
205
201
209
206
114
111
104
119
154
124
125
120
118
214
217
221
122
113
123
112
107
248
246
250
244
252
242

FIG. 12

AUTOMATIC TURNING ICE BLOCK APPARATUS AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of: U.S. Provisional Patent Application Ser. No. 62/054,426 filed Sep. 24, 2014 and entitled "AUTOMATIC TURNING ICE BLOCK APPARATUS AND METHOD" hereby expressly incorporated by reference in its entirety. Furthermore, any and all priority claims identified in the Application Data Sheet, or any correction thereto, are hereby incorporated by reference under 37 C.F.R. §1.57.

FIELD OF THE INVENTION

This invention relates generally to the field of ice making equipment or other similar machines for creating frozen blocks from liquid, and more particularly relates to such machines which produce a relatively large block from liquid. The invention further relates to the mechanism for releasing frozen blocks of ice by use of a turning means.

BACKGROUND

This disclosure relates to an ice machine which makes and harvests blocks of ice automatically. Existing machines for making blocks of ice are unduly complex, corrode over time, and produce ice which may not be sanitary, are not energy/cost effective and/or require the presence of personnel to operate the machine: These factors lead to increased costs of production of ice blocks. The ice machine of the present invention overcomes the aforementioned disadvantages.

SUMMARY

The present invention is directed at an ice machine which is energy cost effective and does not require the attendance of an operator while making and harvesting blocks of ice. The machine is totally automatic and can operate twenty-four hours a day without the presence of an operator.

In one aspect of the invention, an apparatus for freezing a liquid into a plurality of large solid blocks and subsequently automatically releasing the large solid blocks by enabling an external controller/gearbox configured to rotate the body of the apparatus in order to release the plurality of ice blocks without manual handling or touching. Around the perimeter of the evaporator are a number of rectangular shaped heat transfer compartments configured horizontally along the bottom of the evaporator and vertically around the four sides of the rectangular evaporator and optionally around each of the containers configured to hold liquid, where a refrigerant composition, typically a refrigerant liquid of known type such as ammonia, Freon, or anti-freeze, is directed through an opening to freeze a liquid (typically, water into ice). After a configured number of hours when desired interior temperature is reached the cold anti freeze (or refrigerant) will stop cycling around the evaporator and exit the evaporator. Also, the evaporator comprising a turning means to allow an external controller/gearbox or external system to facilitate 180 degree rotation in order to release the plurality of ice blocks from their respective containers after the cold anti-freeze exits the evaporator. Further, where a defrosting fluid (or anti-freeze) of room or elevated temperature, typically a liquid or gas, is subsequently directed through the inlet then into the heat transfer compartments

surrounding the perimeter (i.e. 4 sides) and bottom portion of the body of the evaporator to enable the plurality of ice blocks to separate and release from the container by creating a thin layer of melted material adjacent the heat transfer compartments.

In another aspect of the disclosure, an ice block apparatus including at least one inner casing configured to receive liquid, including an open top side configured to allow the receipt of water, wherein the at least one inner casing may comprise an inner structure having a bottom side and four vertical sides. The ice block apparatus further including an outer easing configured along exteriors of the at least one inner casing creating a chamber configured between the inner casing and the outer casing, wherein the outer casing may allow for the chamber to exist within the space between the exterior of the inner casing and the interior of the outer casing. The chamber may be hollow. The ice block apparatus further including an inlet means configured to allow antifreeze into the chamber, the inlet means may be an opening within a bottom portion of the ice block apparatus. The ice block apparatus further including an outlet means configured to allow for the discharge of antifreeze from the chamber, the outlet means may be an opening within a top portion of the ice block apparatus. The ice block apparatus further including a supporting framework attached to the outer casing configured to allow the turning of the ice block apparatus.

In yet another aspect of the disclosure, a method of freezing ice blocks including pouring a liquid into a liquid reservoir maintained within an ice block apparatus in an upright position. The method of freezing ice blocks including allowing a cold antifreeze from a cold antifreeze reservoir through an entrance valve to an inlet means by means of a pump into an inner chamber of the ice block apparatus. The method of freezing ice blocks further including allowing the cold antifreeze within the inner chamber of the ice block apparatus to be discharged through a discharge means to a dump valve directed towards a refrigeration system to be cooled and returned to the cold antifreeze reservoir. The cold antifreeze reservoir may contain a thermostat used in conjunction with a control timer to allow the controller to determine that the liquid within the liquid reservoir is frozen. The method of freezing ice blocks further includes allowing the cold antifreeze to circulate through the inner chamber of the ice block apparatus, the refrigeration system, and the cold antifreeze reservoir until a controller determines that the liquid within the liquid reservoir is frozen. The method of freezing ice blocks further includes turning the ice block apparatus in the upright position by one hundred and eighty degrees by means of an external apparatus. The method of freezing ice blocks further includes allowing warm antifreeze from a warm antifreeze reservoir through the entrance valve to the inlet means by means of a pump into the inner chamber of the ice block apparatus. The method of freezing ice blocks further includes allowing the warm antifreeze within the inner chamber of the ice block apparatus to be discharged through the discharge means to a dump valve directed towards the warm antifreeze reservoir. The warm antifreeze reservoir may utilize a float switch to determine when to discontinue the flow of warm antifreeze through the entrance valve into the inner chamber of the ice block apparatus. The method of freezing ice block further includes harvesting the frozen liquid within the liquid reservoir and waiting until the remaining warm antifreeze is discharged from the inner chamber of the ice block apparatus. The method of freezing ice block further includes returning the ice block apparatus into the upright position by means of the external apparatus, wherein the external apparatus may be a gear and motor apparatus configured to turn the ice block apparatus into a harvest position and an uptight position. The method of freezing ice blocks, further including utilizing a discharge timer to determine when the warm antifreeze has been discharged from the ice block apparatus. Also, the entrance valve and/or the dump valve may be a three way valve.

In yet another aspect of the invention, a tea pound ice block apparatus, including a plurality of reservoirs configured to receive liquid for freezing and a first cavity encasing the exteriors of the plurality of reservoirs, having a hollow inner cavity encompassing the volume of space between the exterior of the plurality of reservoirs and the interior of the first cavity. The ten pound ice block apparatus further includes a second cavity used to receive overflow antifreeze exiting from the inner cavity by means of a first outlet means. Also, the ten pound ice block apparatus further includes an inlet means configured to allow antifreeze to enter the inner cavity, a second outlet means configured to allow antifreeze to exit the discharge compartment and re-circulate back into the inner cavity, and an overflow means configured to allow antifreeze to exit the discharge compartment and returned to an antifreeze reservoir. Lastly, the ice block apparatus further includes a turning means configured to allow an external apparatus to rotate the ten pound block apparatus upside down and right side up. The plurality of reservoirs may be rectangular in shape. The discharge compartment may be adjacent to the first cavity. The inlet means may be an opening within a bottom portion of the first cavity. The second outlet mean may be an opening within a bottom portion of the second cavity. The overflow means may be an opening within the top portion of the second cavity. The first out let means may be an opening between the first cavity and the second cavity.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a side view of an ice block evaporator for 10 lbs. block.

FIG. **2** illustrates a side view of the ice block system for 10 lbs. block.

FIG. **3** illustrates a top view of the ice block evaporator for 10 lbs block.

FIG. **4** illustrates a side view of an ice block evaporator for 10 bs block.

FIG. **5** illustrates the top view of the ice block system for 300 lbs. block.

FIG. **6** illustrates the top view of the ice block evaporator for 300 lbs. block.

FIG. **7** illustrates the side view of the ice block evaporator for 300 lbs. block.

FIG. **8** illustrates the side view of the ice block evaporator for 300 lbs. block.

FIG. **9***a* illustrates a prospective view of the 10 lbs. ice block evaporator.

FIG. **9***b* illustrates an internal view of the overflow outlet opening of the 10 lbs. ice block evaporator.

FIG. **9***c* illustrates an internal view of the first inlet and re-circulate outlet of the 10 lbs. ice block evaporator.

FIG. **9***d* illustrates an internal view of the opening along the lower heat transfer compartment of the 10 lbs. ice block evaporator.

FIG. **10***a* illustrates a prospective view of the ice block evaporator for 300 lbs. block.

FIG. **10***b* illustrates a bottom and internal view of the ice block evaporator for 100 lbs. block.

FIG. **11** illustrates a refrigeration system for the 10 lbs. block evaporator.

FIG. **12** illustrates a refrigeration system for the 300 lbs. block evaporator.

DETAILED DESCRIPTION

FIG. **1** is an exemplary embodiment of a side view of an ice block evaporator for 10 lbs. block. In one embodiment, a rectangular shaped 10 lb evaporator **105** having four sides and bottom section and plurality of containers for which liquid (i.e. water) are to be housed for the formation of ice blocks. The top portion of the 10 lb evaporator **105** is open and does not contain a cover or heat transfer compartment, but rather open to allow for the entrance of water or other liquids into containers **103** housed within the evaporator. The evaporator may comprise at least one lever **116** extending a horizontally from one end of the evaporator to the other end. In one embodiment, two levers **116**, one on each side of the evaporator as shown in FIG. **1**. Each lever **116** within the evaporator will comprise a turning means to allow the 180 degree turn of the evaporator after the liquid contained within the containers is ready for harvesting due to reaching ideal temperatures or being frozen. At the bottom portion of the evaporator **105** is a first heat transfer compartment **108** which allow for the flow of anti-freeze to travel from the first inlet (anti-freeze in **106**) **106** and upwards through each of the four vertical heat exchange compartments the to the overflow outlet opening **133**. In addition, around each of the four vertical sides of the 10 lb evaporator **105** is a heat transfer compartment (the volume of space in between the external of the container **103** walls and interior of the evaporator OR the volume of space in between the external of the container **103** walls of two or more containers) which allow for the flow of refrigerant or anti-freeze within. The cold anti-freeze enters the evaporator from the first inlet **106** which may have an entrance control valve (not shown) to control the inlet flow of cold anti-freeze into the evaporator. From the first inlet **106**, the cold anti-freeze then travels towards the water pump **119** where the motor of the water pump **119** forces the refrigerant or anti-freeze to travel towards the lower heat transfer component **108** along the bottom portion of the 10 lb evaporator **105**. As the cold anti-freeze begins to accumulate within the lower heat transfer compartment **108**, the anti-freeze will pass through a small opening **171** wherein the anti freeze will rise through each of the vertical heat transfer components **134** between the containers and alongside the inside perimeter of the 10 lb evaporator **105**, or optionally configured internally within the exterior of said containers housed within the 10 lb evaporator **105**. When the anti-freeze reaches the top portion of the 10 lb evaporator **105**, then it will exit from the discharge outlet opening **110** and travel through the dump valve **111** (not shown) towards the water pump **119** to be cycled through the evaporator. Once the evaporator has reached a desired temperature for a desired period of time to allow for liquid within the containers to freeze then the evaporator will request the cold anti-freeze to exit by means of the discharge outlet opening **110** wherein the anti-freeze **104** will cycle through the external refrigeration system comprised of a compressor (not shown), condenser (not shown) and expansion valve (not shown). After the 10 lb evaporator **105** is turned 180 degree by an external subsystem (not shown) then the external refrigeration system will begin to provided room temperature or warm anti-freeze into the evaporator by means of the first inlet **106** to allow for the harvesting of frozen blocks within the containers (not shown). The warm anti-freeze **125** will be pumped into the lower heat transfer compartment **108** along the bottom (now top) portion of the 10 lb evaporator **105** wherein the warm anti-freeze **125** will propagate towards the vertical heat transfer components **134** in between the containers and along the perimeter of the 10 lb evaporator **105** and exiting by means of overflow outlet opening **133** into the overflow cavity **135**, then flowing downward towards the re-circulate outlet line **109** and cycled through to the water pump **119** again into the evaporator. Once the overflow cavity **135** is filled, then the anti-freeze is discharged through the overflow outlet opening **110**. As the release (or harvesting cycle) continues, the walls of the containers will begin to melt and allow for the release of ice blocks from the evaporator.

FIG. **2** illustrates a side view of the ice block system for 10 lbs. block. FIG. **2** illustrates the evaporator shown and described in FIG. **1** above with a focus onto describing the external system configured to provide the cold and warm temperature anti-freeze into the evaporator. In one embodiment, the discharge outlet opening **110** provides anti-freeze into the external system from the 10 lb evaporator **105** whereby the external system is responsible for modifying the chemical properties of the anti-freeze to suit the needs desired by the evaporator at that particular time. In another embodiment, the discharge outlet opening **110** provides cold anti-freeze into the external system from the evaporator whereby the external system comprising compressor **302**, condenser **304** and expansion valve **306** to modify the cold anti freeze into warn anti-freeze and direct the warm anti-freeze into the first inlet **106** to be processed by the evaporator. In yet another embodiment, the discharge outlet opening **110** provides warm anti-freeze into the external system from the evaporator whereby the external system comprising compressor **302**, condenser **304**, and expansion valve **306** modify the cold anti-freeze into warn anti-freeze and direct the warm anti-freeze into the first inlet **106** to be processed by the 10 lb evaporator **105**.

FIG. **3** illustrates a top view of the ice block evaporator for 10 lbs block. FIG. **3** provides a top view prospective of the 10 lb evaporator **105** wherein pluralities of containers are housed within the evaporator **105** (i.e. 20 containers). In addition, the 10 lb evaporator **105** may include internally at least four heat transfer components along the A, B, C, D sides of the 10 lb evaporator **105**. In another embodiment of FIG. **2**, the evaporator may include internally a plurality of heat transfer chambers between the space between the exterior walls of the containers and the interior wall of the 10 lb evaporator **105**. Additionally, FIG. **3** provides an example of a 10 lb evaporator **105** comprising at least two discharge outlet openings **110**. Moreover, FIG. **3** provides an example of containers **103** which may be filled with liquid and allowed to freeze. Also, FIG. **3** provides an example of the lever **116** extending between two sides of the 10 lb evaporator **105** with a beam configured internally within the evaporator **105** to allow for the turning of the evaporator by an external system (not shown). The 10 lb evaporator **105** contains a side cavity **127** to allow the overflow of anti-freeze from the plurality of heat transfer chambers to be deposited, and when the side cavity is filled to capacity, and then the side cavity **127** integrates with the discharge outlet opening **110** to allow the anti-freeze to exit the 10 lb evaporator **105**.

FIG. **4** illustrates a side view of an ice block evaporator for 10 bs block. In one embodiment, the first inlet **106** allows anti-freeze to be directed if the entrance control valve (not shown) is opened to release anti-freeze towards the water pump. The water pump **119** pumps anti-freeze upward into the 10 lb evaporator **105** and first heat transfer compartment **108** along the bottom portion of the evaporator. In an exemplary embodiment, the evaporator may contain two dump valves **111** to allow for the release of anti-freeze either back to the water pump **119** or towards the external system (shown and described in FIG. **2**). On embodiment, the evaporator may contain one or more discharge outlet opening **110**, to allow for circulation or the release of pressure within the evaporator. Lastly, as shown in FIG. **4** the side view illustrates the presence of a lever **116** to allow for turning of the ice block up to 180 degrees.

FIG. **5** illustrates the top view of the ice block system for 300 lbs. block. A complete refrigeration system may be comprised of the following set of components, including an evaporator **312**, compressor **302**, condenser **304**, expansion valve **306**, and pump **119**. In one embodiment, the integration of these components begins with the compressor **302** receiving vaporized anti-freeze by means of an anti-freeze return wherein the compressor pushes vaporized anti-freeze to the condenser **304** wherein the condenser **304** transforms the chemical makeup of the anti-freeze from a vapor to liquid state. The liquid refrigerant will be held in a cold anti-freeze tank during this process. The liquid anti-freeze **124** then goes through an expansion valve **306** where it is pressurized and forced by means of a pump **119** to enter the evaporator **312** to cool the contents of the evaporator **312**.

Dependent upon a preconfigured setting, the anti-freeze exits the evaporator it returns to the compressor **302** for processing once more. Upon reaching a desired temperature for a pre-determined timeframe the automatic turning ice block apparatus will begin to release the cold-anti-freeze **124** back to the compressor **302**. Upon semi or complete exit of the cold anti-freeze from the evaporator **312** the evaporator **312** will begin to turn up to 180 degrees by means of an external gearbox/controller or external system configured to rotate the evaporator **312**. Thereafter, a secondary tank (not shown) containing warm anti-freeze **125** will be pumped by the pump **119** in order to dispense warm anti-freeze **125** into the evaporator **312** to allow for the container **103** inside the evaporator containing frozen ice block to begin to thaw alongside the interior walls and permit the release of ice block from the containers **103** as a result thereof.

FIG. **6** illustrates the top view of the ice block evaporator for 300 lbs. block. An exemplary 300 lbs. ice block evaporator contains a plurality of components which will be described in detail below. In one embodiment, the process of cooling liquid within the single container **103** having exterior container walls **240** includes the first inlet **206** permitting the flow of cold anti-freeze **124** to enter the top portion of the 300 lb evaporator **205**. The cold anti-freeze **124** then fills the first heat transfer compartment **242** extending the entire right most side (Side A) of FIG. **6**. Each of heat transfer compartments comprises a space between the 300 lb evaporator **205** and the container walls **240**. When the anti-freeze **124** has completely filled the heat transfer compartment **240** (Side A) it will begin to exit through an opening in the bottom **401** of Side A and entering through the opening in the bottom of **402** of Side C where the integration of these two openings is diagonal pathway from Side A to Side C. The cold anti-freeze **124** then fills the second heat transfer compartment **248** extending the entire of Side C of FIG. **6**. When the anti-freeze has completely filled the heat transfer compartment **248** (Side C) it will begin to exit through an opening in the top **404** of Side C and entering through the opening in the top of **403** of Side B where the integration of these two opening is diagonal pathway from Side C to Side B. The cold anti-freeze **124** then fills the third heat transfer compartment **250** extending the entire of Side B of FIG. **6**. When the anti-freeze **124** has completely filled the heat transfer compartment **250** (Side B) it will begin to exit through an opening in the bottom **405** of Side B and entering through the opening in the bottom of **406** of Side D where the integration of these two opening is diagonal pathway from Side B to Side D. The cold anti-freeze **124** then fills the fourth heat transfer compartment **252** extending the entire of Side D of FIG. **6**. When the anti-freeze has completely filled the heat transfer compartment **252** (Side D) it will begin to exit through an opening in the exit line **209** of Side D. The exit line **209** will transmit the anti-freeze to the external system shown and described in FIG. **5** above.

In one embodiment of FIG. **6** of the 300 lbs. ice block evaporator, the evaporator may be comprised of an external 300 lb evaporator **205** encompassing the multiple heat transfer compartments (**242**, **248**, **250**, and **252**) and configured with a rod threaded through the inside central portion of the 300 lb evaporator **205** whereby to permit the turning of the evaporator by means of turning means integrated with the lever **216** as shown and described in FIG. **6**. Moreover, the 300 lb evaporator **205** may need additional support in order to turn the block of ice within the evaporator after it's been frozen and ready for harvesting. Therefore, there is a need for the 300 lb evaporator **205** to have a proper support by means of multiple solid stainless steel 1 inch by 2 inch square beams (not shown) extending from Side A to Side B and/or from Side C to Side D. Alternatively, the support beams (not shown) may be placed around the 300 lb evaporator **205** to support the evaporator **205** when the evaporator is rotated by an external system configured to rotate the evaporator up to 180 degrees.

After the cold anti-freeze **124** has been cycling throughout the 300 lb evaporator **205** for a predetermined time period (i.e. 5 hours) while desired internal temperature is reached, the cold anti-freeze **124** will receive an trigger or electronic signal to stop cycling around the evaporator and exit the evaporator by means of the exit line **209**. Thereafter, the evaporator will begin to rotate up to 180 degree from its original position by means of external system acting on the turning means **216** to cause the rotation. After the evaporator is rotated 180 degrees then warm or room temperature anti-freeze **125** will begin to enter the evaporator by means of the inlet **206** and maintain the same flow as described above when the cold anti-freeze entered the except that the connecting pathways between sides will be in opposite configurations (i.e. if top then now it's at the bottom). As the warm anti-freeze makes its way through the four heat transfer compartments (**242**, **248**, **250**, and **252**) the containers walls will be begin to release the attached ice and the warm anti-freeze **125** will exit from the exit line **209**. After successful release of the ice from the evaporator, the external system acting on the turning means **216** will be triggered to rotate the evaporator back to its original position to begin the process once again.

FIG. **7** illustrates the side view of the ice block evaporator for 300 lbs. block. In one embodiment, the inlet **206** permits the flow of cold anti-freeze **124** into the evaporator **312** whereby the cold anti-freeze **124** travels from the top most portion of heat transfer compartment **242** of Side A until it's filled. When the anti-freeze has completely filled the heat transfer compartment **242** (Side A) it will begin to exit through an opening in the bottom **401** of Side A and entering through the opening in the bottom of 402 of Side C where the integration of these two openings is diagonal pathway from Side A to Side C. In one embodiment, the container **707** within the evaporator **205** is supported by at least one support beam **710** or three support beams **710** (as shown in FIG. **7**) surrounding the entire perimeter of the container. In one embodiment, the support beams comprising stainless steel beams measuring 1 inch by 2 inch and share shaped, other shapes and material may be used while still not diverging away from the purpose of these beams.

FIG. **8** illustrates the side view of the ice block evaporator for 300 lbs. block. In one embodiment, the inlet **206** permits the flow of cold anti-freeze **124** into the evaporator whereby the cold anti-freeze **124** travels from the top most portion of heat transfer compartment **242** of Side A until it's filled. In one embodiment, the container **103** within the 300 lb evaporator **205** is supported by at least one support beam **710** or three support beams as shown in FIG. **8** extending from Side A of the 300 lb evaporator **205** to Side B of the evaporator **205**. In one embodiment, the support beams **710** comprising stainless steel beams measuring 1 inch by 2 inch and square shaped, other shapes and material may be used while still not diverging away from the purpose of these beams.

FIG. **9***a* illustrates a prospective view of a 10 lbs. ice block device. In one embodiment, the 10 lbs. ice block device is an evaporator apparatus configured to freeze liquid into solid state comprising a lower heat transfer compartment **108**, and a plurality of vertical heat transfer compartments **134** configured between the interior lining of the 10 lb evaporator **105** and the exterior lining of each of the plurality of ice block containers **103** configured to store liquid for freezing. The apparatus includes a primary cavity where anti-freeze is dispensed for freezing purposes and a secondary cavity **127** to contain overflow anti-freeze and discharge anti-freeze from the evaporator. The apparatus is configured to receive anti-freeze through a lower opening, allow the anti-freeze to fill within the plurality of heat transfer compartments **108** and as the anti-freeze level rises within the evaporator then the ice contained within the plurality of containers begins to freeze more rapidly. The secondary cavity **127** is integrated with a re-circulate outlet line **109** to facilitate the recycling of anti-freeze into the evaporator and a discharge outlet opening **110** to facilitate the return of the anti-freeze to respective anti-freeze reservoirs. The 10 lbs device is comprised of a lever **116** along its center axis so as to allow the 10 lb device to rotate 360 degrees in order to allow for automatic harvest cycle. An external gear/motor will be configured to allow for the rotation of the 10 lbs. ice block apparatus.

FIGS. **9***a*, **9***b*, **9***c*, and **9***d* illustrate the internal prospective view of the 10 lb evaporator. In one embodiment, antifreeze flows through a first inlet **106** from a bottom portion of the apparatus into a lower heat transfer compartment **108** wherein the antifreeze fills the entire compartment **108** before proceeding upwards through a small opening **171**. Upon filling the lower heat transfer compartment **108**, the antifreeze will travel through the small opening **171** upwards into a plurality of heat transfer compartments **134** which surround the plurality of containers **103** housed within the evaporator **105**. After the plurality of heat transfer compartments are filled with antifreeze, then the antifreeze will travel through an overflow outlet opening **133** into an overflow cavity **135**. Thereafter, the anti-freeze will be discharged for re-circulation purposes through the re-circulate outlet line **109**. After the overflow cavity **135** is filled with anti-freeze, then any overflow anti-freeze will be discharged through a discharge outlet opening **110** to be cooled in an external antifreeze reservoir (not shown).

FIG. **10***a* is an illustrative a side views of a 300 lbs. ice block device. In one embodiment, the 300 lbs. ice block device is an evaporator apparatus configured to freeze liquid into solid state comprising at least one container configured to maintain liquid for freezing, a body configured to maintain the contents of the evaporator apparatus, and heat transfer compartment including the volume of space available between the exterior of the at least one container and the interior of the body of the evaporator. The 300 lbs. evaporator apparatus is comprised of a plurality of heat transfer compartments including: a inner cavity of the first side **242**, a first half inner cavity of the second side **244**, a second half of inner cavity of the second side **246**, a inner cavity of the third side **248**, an inner cavity of fourth side **250**, and inner cavity of the fifth side **252**. The 300 lbs. apparatus may have at least one opening to allow for the receipt of liquid for freezing into a center container. The 300 lbs. apparatus receives anti-freeze from a first inlet, which may be designed to reside on the top portion of the apparatus, but it may be anywhere within the apparatus, as well. The 300 lbs. apparatus discharges anti-freeze after the anti-freeze has cycles through the entire surface area of the evaporator, except the top, and the discharge opening may be configured along the top portion of the apparatus, but it may be anywhere within the apparatus, as well. The 300 lbs. apparatus contains support beams to facilitate the adequate rotation of the 300 lbs. apparatus in order to facilitate the harvest cycle. An exemplary flow of anti-freeze within the 300 lbs. apparatus is explained in FIG. **12**.

FIG. **10***b* is an illustrative bottom and internal view of the 300 lb evaporator. In one embodiment, the 300 pound evaporator **205** receives cold antifreeze **124**, through a first inlet **206** configured at the top of a first side **242** of the 300 pound evaporator **205**. The cold antifreeze **124** begins to pass through the inner cavity of the first side **242** of the 300 pound evaporator **205** in a downward direction. As the cold antifreeze **124** reaches the bottom of inner cavity of the first side **242** it will begin to pass through a first small opening **262** connecting the bottom portion of the inner cavity of the first side **242**, the first half of inner cavity of the second side **244**, and a inner cavity of the third side **248** to allow the cold antifreeze to begin to pass through the inner cavity of the third side **248** of the 300 pound evaporator **205** in a upward direction through a second small opening **263**. As the cold antifreeze **124** reaches the top portion of the inner cavity of third side **248** it will begin to pass through a third small opening **264** connecting the top of the inner cavity of the third side **248** and the top of a inner cavity of the fourth side **250** to allow the cold antifreeze **124** to begin to pass through the inner cavity of the fourth side **250** of the 300 pound evaporator **205** in a downward direction flowing into a fourth small opening **265** along the bottom of the 300 lb evaporator **205** to the second half of the inner cavity of the second side **246**. As the cold antifreeze **124** reaches the second half of inner cavity of the second side **246**, and as the inner cavity of the second side **246** begins to fill to capacity the cold antifreeze will begin to pass through a fifth small opening **266** connecting the inner cavity of the second side **246**, the inner cavity of the fourth side **250** and an inner cavity of a fifth side **252** to allow the cold antifreeze **124** to begin to pass through the inner cavity of the fifth side **252** of the 300 pound evaporator **205** in a upward direction. As the inner cavity of the fifth side **252** begins to fill up with cold antifreeze **124** then it will discharge the cold antifreeze **124** through an exit line **209**.

FIG. **11** is an illustrative embodiment of a 10 pound device integrated with a refrigeration system. In one embodiment, the first inlet **106** controls the inflow of anti-freeze coming into the 10 lb evaporator body **105** from either a warm anti-freeze reservoir **118** or a cold anti-freeze reservoir **107**. The process of freezing liquid within the device is initiated when the 10 lb evaporator body **105** is in upright position, wherein water or other liquid is provided from a water inlet **102** may be dispensed into the plurality of liquid reservoirs or containers **101** contained within the 10 lb evaporator body **105**. The 10 lb evaporator body **105** initially receives cold antifreeze **124**, through a first inlet **106** configured at the bottom of the device, which is pumped from a cold antifreeze reservoir **107**. The cold antifreeze **124** begins to fill the inner cavity **108** (or heat transfer compartments) of the 10 lb evaporator body **105** wherein it reaches a pre-capacity level **126**, prior to filling to capacity, then it's discharged to a side cavity **127**, through a re-circulate outlet line **109** and re-circulated back into the first inlet **106** along with cold antifreeze **124** introduced from a cold antifreeze reservoir **107**. Then, the cold antifreeze **124** begins to fill the inner cavity of the device **108** wherein it reaches a capacity level **129** (not shown), wherein the cold antifreeze **124** is filled to a capacity, then it's discharged through two outlet means (to be explained further). First, the cold antifreeze **124** will discharge to a side cavity **127**, through a re-circulate outlet line **109** and re-circulate back into the first inlet **106** along with cold antifreeze **124** introduced from a cold antifreeze reservoir **107**. Second, cold antifreeze **124** will discharge through a discharge outlet opening **110**, which may be referred to as overflow discharge, wherein the cold anti-freeze **124** will be directed by the dump valve **111** to the cold antifreeze reservoir **107** for cooling.

There will be a thermostat **112** within the cold antifreeze reservoir **107** which measures the temperature of the cold anti-freeze **124** within the cold antifreeze reservoir **107** and when it reaches a certain temperature value t, then it causes the refrigeration system **113** to shut off, and causes a delay timer **114** to set an expiration time of n value, which will be turned off if the refrigeration system **113** is turned back on prior to expiration of expiration time value set to n. As time goes on, the thermostat **112** within the cold antifreeze reservoir **107** will measure a higher temperature than the temperature value t, and as a result the refrigeration system **113** will be turned on and the expiration time value of n will be turned off. The refrigeration system **113** will continue to provide, by means of a pump **119**, cold antifreeze **124** from the cold antifreeze reservoir **107** into the 10 lb evaporator body **105** through the first inlet **106** to be circulated through the inner cavity **108** of the. The cold antifreeze **124** inside the cavity **108** of the 10 lb evaporator body **105** will continue to discharge from both the re-circulate outlet line **109** and the discharge outlet opening **110** as described above. The cycle described above will continue until the cold antifreeze reservoir **107** temperature reaches a certain temperature value t, and is able to maintain this temperature value t to exceed the expiration time of n.

When the delay timer expiration time of n has been exceeded, then it's determined that the liquid within the liquid reservoirs **101** is frozen and ready for harvesting. The system may set a cold anti-freeze upright drain delay timer **115** value of d**1** to allow cold anti-freeze **124** to drain from the 10 lb evaporator body **105** into the cold anti-freeze reservoir **107**. Upon expiration of the drain delay expiration timer **115** value of d**1**, the lever **116** will begin to turn the 10 lb evaporator body **105** 180 degrees or completely upside down. Then the 10 lb evaporator body **105** may continue to allow cold antifreeze **124** to drain from the 10 lb evaporator body **105** through the discharge outlet opening **110** (a.k.a.

overflow discharge valve) for a pre-determined amount of time d**2** set on cold anti-freeze upside down drain delay timer **117**. Then after expiration of the d**1** and d**2**, then the dump valve will receive request to be re-directed to direct anti-freeze to the warm anti-freeze reservoir **118** and the entrance valve will receive a request to be re-direct to permit warm anti-freeze to enter. At this point, the 10 lb evaporator body **105** is expected to have discharged any cold antifreeze **124** from its heat transfer compartments or cavity **108** and is ready to receive warm antifreeze **125** to release the ice within the liquid reservoirs **101**. At this point, a second reservoir containing warm anti-freeze, also referred to as the warm antifreeze reservoir **118**, will pump warm antifreeze **125** into the evaporator body **105**, which is now upside down, through an entrance valve **124** to a first inlet **106** and allow the warm antifreeze to circulate within the heat transfer compartments or cavity **108** of the evaporator body **105**.

The warm anti-freeze **125** will discharged through the discharge outlet opening **110** (overflow discharge valve) which will now be at the bottom side of the 10 lb evaporator body **105**. Then, the dump valve **111** will direct the warm anti-freeze **125** discharged from the 10 lb evaporator body **105** to return to the warm anti-freeze reservoir **118**. The warm anti-freeze reservoir **118** will have a float switch **120**, which measures the water level in the warm antifreeze reservoir **118**, and when it reaches a certain level, then the entrance valve **124** discontinues the entrance of warm anti-freeze **125** into the 10 lb evaporator body **105** because the central controller **122** knows that the device is now full of warm anti-freeze **125** sufficient to allow harvest to take place. The ice contained within the 10 lb evaporator body **105** will begin to release and eventually all ice will be released. The warm-anti-freeze **125** will continue to discharge through the discharge outlet opening **110** and the dump valve **111** will direct the warm anti-freeze **125** to return to the warm anti-freeze reservoir **118**. After a pre-determined time period set to the warm anti-freeze upside down drain delay timer **121** to allow all the warm-antifreeze **125** to drain d**3**, then the lever **116** will return the device to its normal upright position and the dump valve **111** will be switched to direct antifreeze towards the cold anti-freeze reservoir **107**. The water inlet **102** will begin to provide water **103** to be dispensed into the plurality of liquid reservoirs **101** contained within the 10 lb evaporator body **105**.

FIG. **12** is an illustrative embodiment of a three hundred (300) pound device integrated with a refrigeration system. In one embodiment, a 300 pound evaporator **205** is in upright position, wherein water may be dispensed into a single reservoir **201** contained within the 300 pound evaporator **205**. The 300 pound evaporator **205** receives cold antifreeze **124**, through a first inlet **206** configured at the top of a first side **242** of the 300 pound evaporator **205**, which is pumped from a cold antifreeze reservoir **107**.

The cold antifreeze **124** begins to pass through the inner cavity of the first side **242** of the 300 pound evaporator **205** in a downward direction. As the cold antifreeze **124** reaches the bottom of inner cavity of the first side **242** it will begin to pass through a first small opening **262** connecting the bottom portion of the inner cavity of the first side **242**, the first half of inner cavity of the second side **244**, and a inner cavity of the third side **248** to allow the cold antifreeze to begin to pass through the inner cavity of the third side **248** of the 300 pound evaporator **205** in a upward direction through a second small opening **263**. As the cold antifreeze **124** reaches the top portion of the inner cavity of third side **248** it will begin to pass through a third small opening **264** connecting the top of the inner cavity of the third side **248** and the top of a inner cavity of the fourth side **250** to allow the cold antifreeze **124** to begin to pass through the inner cavity of the fourth side **250** of the 300 pound evaporator **205** in a downward direction flowing into a fourth small opening **265** along the bottom of the 300 lb evaporator **205** to the second half of the inner cavity of the second side **246**. As the cold antifreeze **124** reaches the second half of inner cavity of the second side **246**, and as the inner cavity of the second side **246** begins to fill to capacity the cold antifreeze will begin to pass through a fifth small opening **266** connecting the inner cavity of the second side **246**, the inner cavity of the fourth side **250** and an inner cavity of a fifth side **252** to allow the cold antifreeze **124** to begin to pass through the inner cavity of the fifth side **252** of the 300 pound evaporator **205** in a upward direction. As the inner cavity of the fifth side **252** begins to fill up with cold antifreeze **124** then it will discharge the cold antifreeze **124** through an exit line **209** wherein the dump valve **111** is switched to allow the cold antifreeze to return to a cold antifreeze reservoir **107**.

There will be a thermostat **112** within the cold antifreeze reservoir **107** which measures the temperature of the anti-freeze **104** and when it reaches a certain temperature value t, then it causes the refrigeration system **113** to shut oft; and causes a upright cold anti-freeze delay timer **214** to set an expiration time of n value, which will be turned off if the refrigeration system **113** is turned back on prior to expiration of expiration time value set. As time goes on, the thermostat **112** within the cold antifreeze reservoir **107** will measure a higher temperature than the temperature value t, and as a result the refrigeration system **113** will be turned on and the expiration time value of n will be turned off. The refrigeration system **113** will continue to provide, by means of a pump **119**, cold antifreeze **124** from the cold antifreeze reservoir **107** into the 300 pound evaporator **205** through the first inlet **206** to be circulated through all five sides of the 300 pound evaporator **205**. The antifreeze within the inner cavities of the 300 pound device **206** will continue to discharge from the exit line **209** as described above. The cycle described above will continue until the cold antifreeze reservoir **107** thermostat **112** detects a temperature to reaches a certain temperature value t, and is able to maintain this temperature value t to a exceed the expiration time of n.

Upon expiration of timer of n, the lever **216** begins to turn the 300 pound evaporator **205** 180 degrees (completely upside down). As a result of reaching temperature value t for an expiration time of n, the microcontroller **122** will send a signal to the refrigeration system **113** to turn it off. Then the 300 pound evaporator **205** will begin to drain the cold antifreeze **124** from the exit line **209**, the first inlet **206**, or both. After a pre-determined amount of time after lever **216** turned the device over as measured by an upside down delay drain timer **217**, then it will be assumed that the cold antifreeze **124** has completely exited the inner cavities of the 300 pound evaporator **205** and been directed towards the cold antifreeze reservoir **107**. At this point, the dump valve **111** is switched to allow any antifreeze **104** discharged from the 300 pound evaporator **205** to be directed towards a warm antifreeze reservoir **118**. Then warm anti-freeze **125** from the warm antifreeze reservoir **118** will be introduced through the first inlet **206**, by means of a pump **119**, to the inner cavities **208** of the 300 pound evaporator **205**. Then warm antifreeze reservoir **118** will provide warm antifreeze **125** into the 300 pound device **206**, now upside down, through a first inlet **206** and allow the warm antifreeze **125** to circulate within the inner cavities of the 300 pound evaporator **205**. The inner cavities of the 300 pound devices includes: the inner cavity of the first side **242**, the first half of inner cavity of the second side **244**, the second half of the inner cavity of the second side **246**, the inner cavity of the third side **248**, the inner cavity of the fourth side **250**, and the inner cavity of the fifth side **252**. The warm antifreeze **125** will travel in an upward direction through the inner cavity of the first side **242**, reach the first half of the inner cavity of the second side **244**, then be directed through the inner cavity of the third side **246**, then the inner cavity of the fourth side **250**, then the second half of the inner cavity of the second side **246**, then the inner cavity of the fifth **252** until it's discharged through the exit line **209**, to the dump valve **111**, to be returned to the warm antifreeze reservoir **118**. The warm anti-freeze reservoir **118** will have a float switch **120** which measures the water level in the warm antifreeze reservoir **118** and which it reaches a certain level, then it automatically stops providing warm antifreeze **125** because it knows that the 300 evaporator **205** is now full of warm anti-freeze **125** sufficient to allow harvest to take place. The ice contained within the single reservoir **201** of the 300 pound evaporator **205** will begin to release and eventually all ice will be released. The warm-anti-freeze **125** will continue to discharge through the exit line **209** and the dump valve will allow the warm anti-freeze **125** to return to the warm anti-freeze reservoir **118**.

After a pre-determined time period measured by the warm antifreeze upside down drain timer **221** to allow all the warm-antifreeze **125** to drain, then the lever **116** will return the 300 pound evaporator **205** to its normal upright position and the dump valve control **111** will be switched to the direct antifreeze **104** towards the cold anti-freeze reservoir **107**. The water inlet **102** will begin to provide water or other liquid to be dispensed into the reservoir **201** contained within the 300 pound evaporator **205**.

It's known in the art to be able to substitute refrigerant in place of anti-freeze inside an evaporator in order to freeze liquid contents into solid state.

What is claimed is:

1. An ice block apparatus, comprising:
- at least one inner casing configured to receive liquid, comprising:
  - an open top side configured to allow the receipt of water;
- an outer casing configured along exteriors of the at least one inner casing creating a chamber configured between the inner casing and the outer casing;
- the chamber, comprising:
  - a first heat transfer compartment occupying a first vertical side, comprising:
    - an inlet fluid line configured to permit the passage of antifreeze through the first heat transfer compartment towards a first opening;
    - a first opening configured to permit the passage of antifreeze downward from the first heat transfer compartment to a first half side of a second heat transfer compartment;
  - a second heat transfer compartment occupying a horizontal bottom side, comprising:
    - the first half side of the second heat transfer compartment is configured to receive antifreeze from the first heat transfer compartment, fill the first half side of second heat transfer compartment with antifreeze, and transport the antifreeze upward to a third heat transfer compartment;
    - a second half side of the second heat transfer compartment is configured to receive antifreeze from a fourth heat transfer compartment, fill the second half side of second heat transfer compartment with anti-freeze, and transport the antifreeze to a fifth heat transfer compartment;
  - a third heat transfer compartment occupying a second vertical side, comprising:
    - a second opening configured to permit the passage of antifreeze upward from the first half side of second heat transfer compartment to the third heat transfer compartment;
  - a fourth heat transfer compartment occupying a third vertical side, comprising:
    - a third opening configured along top portion of the fourth heat transfer compartment to permit the passage of antifreeze from the third heat transfer compartment to the forth heat transfer compartment;
    - a fourth opening configured to permit the passage of antifreeze downward from the forth heat transfer compartment to the second half side of the second heat transfer compartment;
  - a fifth heat transfer compartment occupying a forth vertical side, comprising:
    - a fifth opening configured to permit the passage of antifreeze upward from the second half side of the second heat transfer compartment to the fifth heat transfer compartment;
    - an outlet fluid line configured to permit the discharge of antifreeze from the fifth heat transfer compartment to an external reservoir;
- a supporting framework attached to the outer casing configured to allow the turning of the ice block apparatus.

2. The apparatus of claim **1**, wherein the at least one inner casing further comprising an inner structure having a horizontal bottom side and four vertical sides.

3. The apparatus of claim **1**, wherein the outer casing allows for the chamber to exist within the space between the exterior of the inner casing and the interior of the outer casing.

4. The apparatus of claim **1**, wherein the chamber is hollow.

5. The apparatus of claim **1**, wherein the inlet fluid line is an opening within a top portion of the ice block apparatus.

6. The apparatus of claim **1**, wherein the outlet fluid line is an opening within a top portion of the ice block apparatus.

7. An ice block apparatus, comprising:
- at least one inner casing configured to receive liquid, comprising:
  - an open top side configured to allow the receipt of water,
- an outer casing configured along exteriors of the at least one inner casing creating a chamber configured between the inner casing and the outer casing;
- The chamber, comprising:
  - a first heat transfer compartment occupying a first vertical side, comprising:
    - an inlet fluid line configured to permit the passage of antifreeze into the first heat transfer compartment;
    - a first opening configured to permit the passage of antifreeze from the first heat transfer compartment to a second heat transfer compartment;
  - a second heat transfer compartment occupying a second vertical side, comprising:

a second opening configured to permit the passage of antifreeze from the second heat transfer compartment to a third heat transfer compartment;

The third heat transfer compartment occupying a third vertical side, comprising:

a third opening configured to permit the passage of antifreeze from the third heat transfer compartment to the forth heat transfer compartment;

a fourth heat transfer compartment occupying a forth vertical side, comprising:

a fourth opening configured to permit the passage of antifreeze from the third heat transfer compartment to the fourth heat transfer compartment;

an outlet fluid line configured to permit the discharge of antifreeze from the fourth heat transfer compartment to an external reservoir;

a supporting framework attached to the outer casing configured to allow the turning of the ice block apparatus.

8. The apparatus of claim **7**, wherein the inlet fluid line is arranged along the top portion of the first heat transfer compartment.

9. The apparatus of claim **7**, wherein the first opening is arranged along the bottom portion of the first heat transfer compartment.

10. The apparatus of claim **7**, wherein the second opening is arranged along the top portion of the second heat transfer compartment.

11. The apparatus of claim **7**, wherein the third opening is arranged along the bottom portion of the third heat transfer compartment.

12. The apparatus of claim **7**, wherein the fourth opening is arranged along the top portion of the fourth heat transfer compartment.

13. The apparatus of claim **7**, wherein the chamber is hollow.

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